Shigella

Shigellosis is a Class B Disease and must be reported to the state within one business day.

Shigellosis or bacterial dysentery is an acute infectious enteritis of humans caused by organisms of the *Shigella* bacterial genus.

Epidemiology

Shigella organisms have a human reservoir and are transmitted via the fecal-oral route. Person-to-person transmission is the most frequent mode of transmission. Although rare, common source outbreaks may also occur. *Shigella* bacteria can be transmitted to water or food and are disseminated through these vehicles. Foodborne outbreaks are usually traced to infected food handlers, and are associated with food eaten raw or handled after preparation.

Ninety-nine percent of *Shigella* isolates received by the Louisiana Public Health Laboratory are derived from stools. Stool concentration in infected individuals may be very high, with anywhere from 100,000 to 100 million *Shigella* organisms per gram of feces. *Shigella* has a low infectious dose; ten to 100 organisms may cause illness. The communicable period includes the duration of a person's symptomatic illness up to a variable time (up to four weeks) after the person has recovered from the infection. The incubation period of shigellosis is usually one to three days, with a range of 12 hours to four days. Long-term carriage of *Shigella* is rare in industrialized countries.

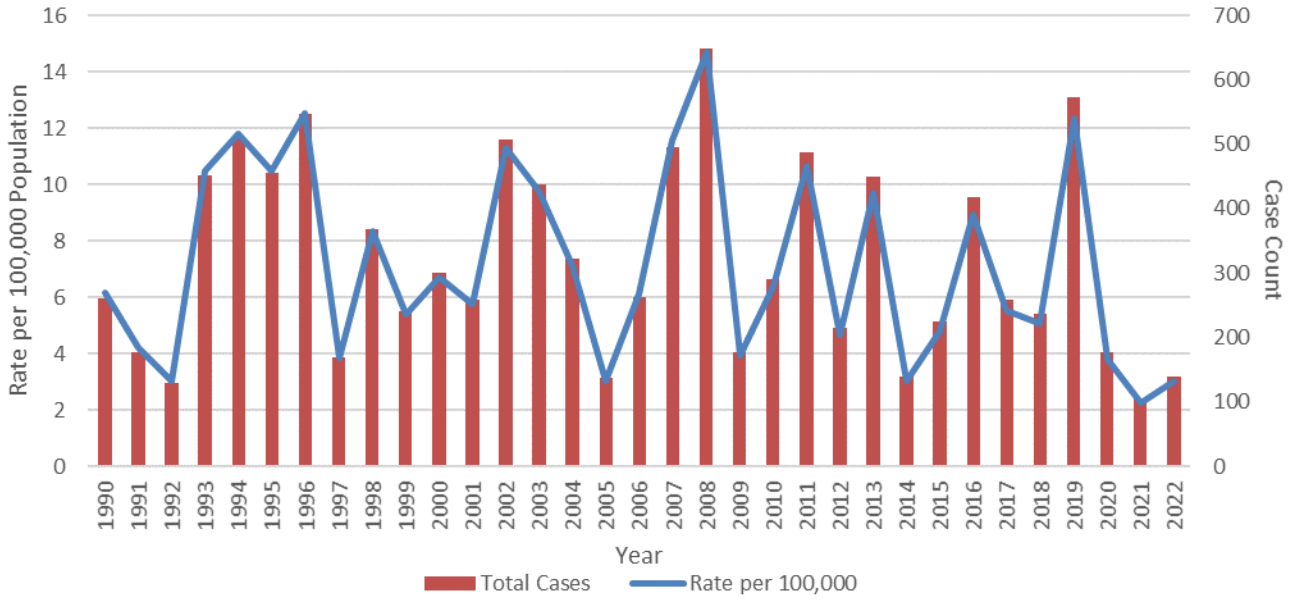
Shigellosis can spread easily among closed populations such as exists in military barracks and ship's quarters. *Shigella* infection is a major concern for some institutions such as those for the mentally disabled and day care centers. Endemic shigellosis appears during infancy but becomes more common among toddlers and young children. Shigellosis has become a significant problem in child care centers and can spread to household contacts. Secondary attack rates in household contacts range from 10% to 40%. Attack rates are higher in younger children than in adults. Breast-fed neonates seem to be protected, but bottle-fed infants are not.

Incidence

There was a general increase in cases in the late 1950s similar to that observed for *Salmonella*, although the two diseases are characterized by completely different epidemiological patterns (*Salmonella* coming from food sources and *Shigella* mostly from person-to-person contact). This increase was likely a reporting artifact reflecting improved diagnostic techniques. The two organisms showed the same pattern of increase in the late 1980s. It is reasonable to conclude that this more recent increase also resulted from a reporting artifact. In the late 1980s, a computerized

disease report system replaced the old manual card system. In recent years there have been about 150 to 650 cases reported annually (3.5 to 14 cases per 100,000 population) with periods of two to four years of high numbers of reports followed by several years of lower case reports. Figure 1 shows a low reported number of cases for 2005; this is due to a disruption in reporting caused by Hurricane Katrina.

Figure 1: Shigellosis Cases and Incidence Rates - Louisiana, 1990-2022

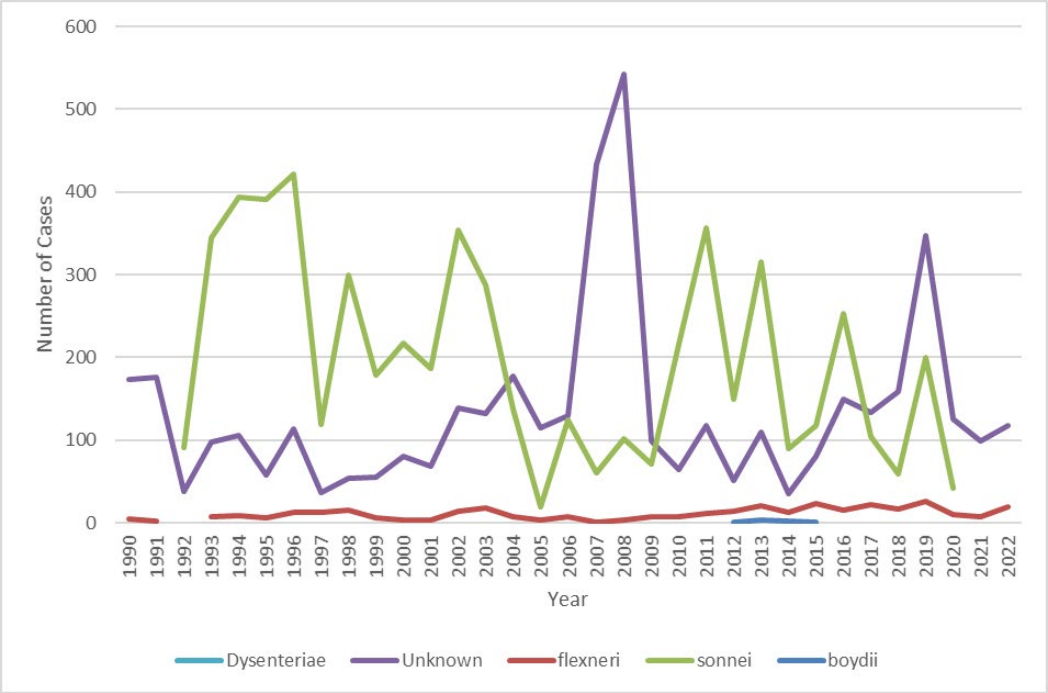


Shigella are divided into four major O antigenic groups:

- *S. dysenteriae*
- *S. flexneri*
- *S. boydii*
- *S. sonnei*

Very large epidemics of *S. dysenteriae* with high morbidity and mortality were common before World War I. In 1920, *S. flexneri* progressively became the most common *Shigella*. After World War II, *S. sonnei* replaced *S. flexneri* in industrialized nations while *S. flexneri* remained predominant in the developing world. In the United States, *S. sonnei* accounts for over 90% of cases (Figure 2).

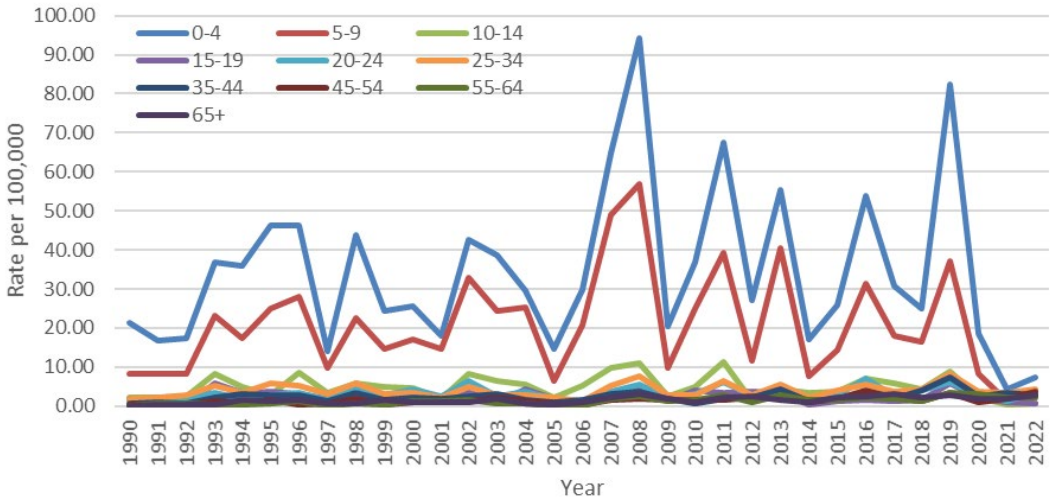
Figure 2: Shigellosis Case Distribution by Type - Louisiana, 1990-2022



Age Group Distribution

Endemic shigellosis appears during infancy and becomes more common among toddlers and young children. These infections are usually associated with poor hygienic conditions**.** Breast-fed neonates seem to be protected but those who are bottle-fed are not. In Louisiana, as in the rest of the U.S., children younger than 10 years of age show the highest incidence rate of shigellosis (Figure 3).

Figure 3: Shigellosis Incidence Rates by Age - Louisiana, 1990-2022



The peaks and troughs observed in trends of *Shigella* infections are mainly driven by the number of cases in children. There is a slight rise in incidence in young adults, then a decline until rates stabilize in middle age. There is no difference in incidence rates of shigellosis for males and females. Likewise, there is no difference in incidence rates for Whites and African-Americans.

Seasonal Distribution

Shigella cases are reported throughout the year. There is an increase in the number of cases in the summer months (Figure 4).

Figure 4: Shigellosis Cases by Month - Louisiana, 1990-2022